UNIVERSITY NEIGHBOURHOODS ASSOCIATION

UNA BOARD MEETING
OPEN SESSION

Report Date:	May 26, 2026
Meeting Date:	May 26, 2026
From:	Wegland Sit, Operations Manager
Subject:	UNA Emerald Ash Borer Strategy

Background

This report outlines the proposed **Emerald Ash Borer (EAB) Management Strategy** for the Hampton Area, which maintains an inventory of approximately **79 ash trees**. This strategy provides a comprehensive framework for **prioritizing** and **categorizing** treatments, managing eventual staged removals, and implementing species diversification, budgetary forecasting as detailed in the attached documentation.

Decision Requested

THAT the UNA Board:

> *Approve Option 2 (Expanded Scenario) as the designated EAB Management Strategy for the Hampton Area including an updated tree replacement ratio of 2:1;*
>
> *AND authorize staff to initiate the treatment program in June.*

Discussion

Hampton Place Street Trees

Hampton Place contains 79 ash trees (*Fraxinus* species), which comprise the vast majority of the approximately 83 street trees in that specific corridor. While these trees represent only 2.7% of the UNA's total street tree population (roughly 2,700 trees), they constitute the only concentrated population of ash trees within the UNA's jurisdiction.

With Emerald Ash Borer activity now confirmed and regulated by the **Canadian Food Inspection Agency (CFIA)** within the Metro Vancouver area (specifically Vancouver and University of British Columbia (UBC)), this concentration creates a significant localized vulnerability; a successful infestation would result in the near-total loss of the Hampton Place canopy.

What is the Emerald Ash Borer (EAB)?

The Emerald Ash Borer (*Agrilus planipennis*) is a highly destructive, invasive beetle from Asia. It is responsible for the death and decline of tens of millions of ash trees across North America. North American ash trees have not evolved defenses against the beetle, making them extremely vulnerable. An infested tree will typically die within 2 to 4 years, though heavily infested trees can die in as little as one year.

Regional Context & Neighboring Response

The City of Vancouver (COV) is actively responding to the confirmed presence of EAB within the region. Their strategy employs a multi-pronged approach to slow the spread and protect high-value assets.

UNA Operations recently consulted with the COV Integrated Pest Management (IPM) team. They confirmed that the nearest positive EAB case was identified near **W 12th Avenue and Salal Drive in late 2025**. This location is approximately **6 km** from the Hampton Place area, placing the UNA within the immediate range of natural beetle dispersal.

COV Treatment Protocols

The COV is selectively treating healthy, high-value ash trees on public lands with TreeAzin, a systemic botanical insecticide.

- Method: Direct trunk injection, ensuring the product remains contained within the tree's vascular system.
- Safety: TreeAzin is considered safe for the surrounding environment, including pollinators and wildlife.
- Duration: Effective for up to **two years** per treatment cycle.

Public Communication & Criteria

The COV uses **Green Plastic Bands** on street trees to alert the public that the specimen is an ash tree and may eventually be removed due to EAB. The COV IPM office determines treatment eligibility based on:

- Health Condition: Only trees with a healthy canopy are candidates for preservation.
- Diameter at Breast Height (DBH): Size requirements must be met to ensure the treatment is a viable long-term investment.

The UNA Emerald Ash Borer Strategy

Given the confirmed presence and imminent arrival of EAB in the surrounding region, the UNA engaged Diamond Head Consulting to develop a comprehensive, long-term Emerald Ash Borer Strategy and Treatment Plan. This plan was cross-referenced with

our 2026 tree inventory to ensure that all recommendations are based on the most current data regarding tree health and location.

Strategic Objectives

The primary intent of this strategy is to transition from reactive maintenance to a proactive management model, centered on the following five pillars:

1. Preservation of High-Value Canopy: Identifying and protecting the healthiest, most prominent ash trees to maintain the immediate aesthetic and environmental value of Hampton Place.
2. Mitigation of Sudden Canopy Loss: Preventing a "mass mortality event" where all 79 trees decline simultaneously, which would result in a drastic loss of neighborhood character and ecosystem services.
3. Fiscal Responsibility: Distributing the costs of treatment, removal, and replacement over a multi-year cycle to avoid the significant budgetary impact of unmanaged, emergency tree failures.
4. Urban Forest Transition: Leveraging this challenge as an opportunity to transition Hampton Place toward a diverse, climate-resilient urban forest that is less susceptible to single-species pests.
5. Risk & Liability Reduction: Proactively removing high-risk or infested specimens before they become hazardous, thereby protecting residents and municipal infrastructure.

Hampton Place Ash Trees are first grouped into the following management categories

Category	Descriptions	Criteria	Strategy	Quantity	Treatment Period	Eventual Removal
A	**Core Retain Trees**	High-value, good/excellent condition, prominent canopy	Long-term treatment	25	2026-2068	2070-2074
B	**Transition Retain Trees**	Moderate condition or lower landscape value	Time-limited treatment (10–20 yrs)	14	2026-2040	2042-2046
C	**Bridge Retain Trees**	Moderate condition or hold the canopy temporarily	Time-limited treatment (8–12 yrs)	10	2026-2032	2034-2038
D	**Non-Retention Trees**	Poor condition (3-4 trees)	Strategic Early Removal	4	n/a	2026
E	**Small Trees**	Young (<30 cm DBH)	Grow vs Strategic Removal	7	n/a	2026-2027

Table 1 – Tree Management Categories

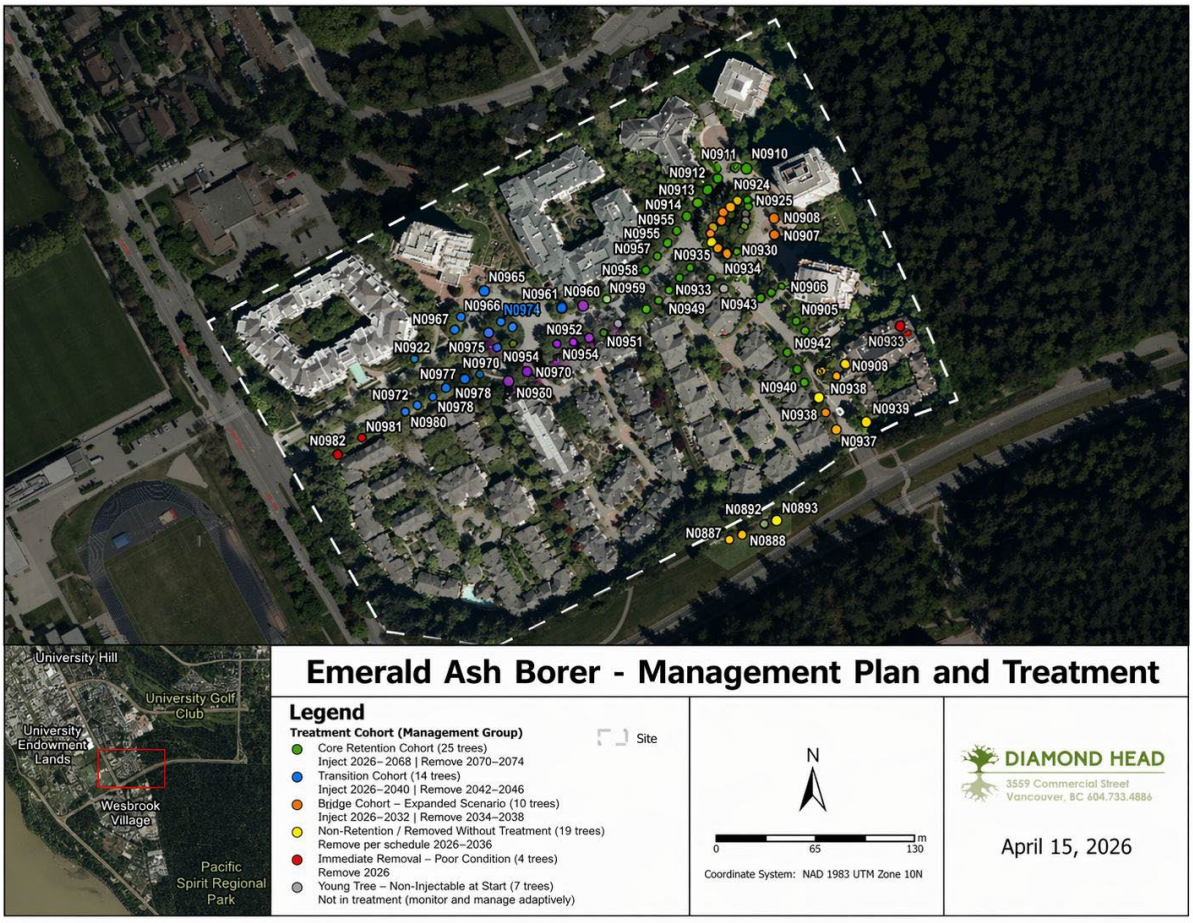

Figure 1. The treatments were organized by cohort over time so that the distribution of treatments can be visualized within the neighbourhood.

This long-term approach ensures that the neighborhood's canopy remains intact while we transition the forest toward a more sustainable future.

The strategy is divided into four critical components:

1. **Phase I: Aggressive Suppression (Years 1–15)** Implementing a 15-year cycle of intensive systemic insecticide treatments (TreeAzin) to stabilize the health of the current canopy and prevent mass mortality during the peak of the regional infestation.
2. **Phase II: Maintenance & Biological Control (Years 16 – onward)** Following the initial suppression phase, the UNA will transition to a maintenance model. This includes reduced treatment frequency and the potential integration of biological controls (such as parasitoid wasps or natural predators) as part of a broader IPM framework.
3. **Phase III: Long-Term Diversification & Selective Preservation (Years 1 – onward)** A deliberate transition plan to replace declining specimens with resilient native and urban-appropriate species. High-value, healthy ash trees will be

selectively preserved, while others are replaced to ensure a diverse, multi-aged forest.

4. **Economic Justification: Cost-Benefit Analysis** showing treatment as more economical than removal and replacement.

Option 1 – Lean Scenario

Under the lean scenario, the intention is to protect only the best currently injectable trees, accepting earlier canopy loss and transitioning faster.

Key features include:

- 2026 Treatment Scope: 39 trees
- No bridge cohort
- Most non-core ash gone earlier
- Stronger cost control
- More visible canopy loss in the first 15 years

This would be a suitable approach if UNA wants

- Minimum long-term treatment footprint
- Simpler operations
- Lower ongoing injection commitment

Total 50-Year Program Cost: **$709K**

Option 2 - Expanded Scenario

The alternate approach is the expanded scenario. Under this approach, there will be additional treatment in the first two decades to smooth canopy loss while replacement happens more gradually.

Key features include:

- 2026 Treatment Scope: 49 trees
- 10 additional Bridge trees retained temporarily to smooth the transition
- Slower visual decline, by maintaining the aesthetic value of the Hampton Place streetscape for a longer duration
- Slightly higher treatment burden but better neighbourhood canopy continuity by avoiding sudden, large-scale canopy loss.

Total 50-Year Program Cost: **$774K**

Implementation Timeline

The first round of TreeAzin systemic injections is scheduled for early-mid **June 2026**. Application will be completed by Diamond Head Consultant.

Financial Implications

Current Funding Status

The initial TreeAzin treatment for 2026 is already accounted for within the approved 2026/27 Tree Management Budget.

Long-Term Capital Requirements

While the treatment costs are the primary focus of this report, the comprehensive 50-year strategy includes several capital and operational requirements beyond the scope of annual injections:

- **Removal & Disposal:** Phased removal of declining or infested specimens. While current ash tree disposal can be managed locally within the immediate restricted zone. However, future regulatory shifts or changes to **CFIA disposal requirements** may impact operations and introduce containment and final disposal costs.
- **Site Preparation:** Infrastructure remediation, including stump grinding and soil amendments.
- **Procurement & Logistics:** Sourcing high-quality, diverse nursery stock and transportation.
- **Professional Installation:** Expert planting and critical early-stage establishment care.

2026 Strategic Hampton Replanting Program

Operations recommends that the Board approve the Hampton Place Replanting Program. This 2026 initiative is designed to restore the neighborhood canopy by addressing the Emerald Ash Borer (EAB) strategy and the tree loss in recent weather events.

Scope of Replanting: The program will replace specimens across the following three categories:

- Non-Retention Trees: Trees identified for immediate removal due to poor health or infestation risk.
- Small Tree Category: Trees that do not meet the manufacturer’s technical requirements for systemic treatment.

- Storm Recovery: Replacement of trees lost during previous windstorm events.

The estimated cost covers the full lifecycle of the replanting process, including the procurement of high-quality nursery stock, site remediation, and professional installation.

- Projected Volume: 15 – 20 trees.
- Unit Cost: Approximately $1,800 per tree (inclusive of purchase, preparation, and installation).
- Total Replanting Funding Request: Approximately **$36,000.00**

The proposed Hampton replanting project involves the strategic removal of trees that are either in poor health or are undersized to meet the criteria for effective systemic treatment. This ensures that the UNA is not investing treatment funds into specimens with low survival probability.

Projected 50-Year EAB Strategy Program Costs(At 1:2 Replacement)

- **Option 1 (Lean Scenario): Approximately $832,000**
- **Option 2 (Expanded Scenario): Approximately $914,000**

Operational Implications

The implementation of the EAB Strategy will integrate into the UNA's existing operational workflows through the following measures:

Maintenance Scheduling

The treatment cycle requires bi-annual applications (every two years). These will be scheduled in advance, as part of the UNA Street and Park Trees Annual Operations, while tree removals will be phased according to the strategy timeline and incorporated into the **Tree Management Operations Budget** and the annual budget planning process.

Collaborative Management

In coordination with UBC C&CP, federal agencies, and municipal partners, the Operations team will oversee all aspects of the EAB strategy. This includes managing removals and site preparation, as well as working with arborists and nurseries to ensure high-quality, climate resilient species selection for the new inventory.

Innovation & Research Opportunities

The replanting of previously downed trees, along with the four immediate removals, presents a unique opportunity for the UNA. The Operations team plans to collaborate with researcher to pilot:

- Passive Subsurface Irrigation: Testing advanced irrigation systems designed for the challenges of municipal street trees.
- Remote Moisture Sensing: Implementing technology to monitor soil health in real-time, allowing for data-driven maintenance and higher survival rates for newly planted trees.

Strategic Objective

Environmental Sustainability

Service Capacity

Attachments

1. UNA Emerald Ash Borer Strategy

Concurrence

1. Sylvia Kwarus, Sustainability Specialist
2. Gal Kaufman, Operations Specialist

Respectfully submitted,

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Wegland Sit

Operations Manager

_____

Paul Thorkelsson

Chief Administrative Officer

Emerald Ash Borer Strategy

For:
University Neighborhood Association

Site Location:
Hampton Place

Submitted to:
Attn: Wegland Sit
University Neighbourhood Association

Email: Wegland.sit@myuna.ca

Date: May 25, 2026

Submitted by:

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All general and professional liability insurance and individual accreditations have been provided below for reference.

Trevor Cox, MCIP, RPP
Director | Senior Arborist
ISA Certified Arborist (PN-1920A)
ISA Tree Risk Assessment Qualified (TRAQ)
BC Parks Wildlife Danger Tree Assessor

Please get in touch with us if there are any questions or concerns about the contents of this report.

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Contents

1.0 Introduction

1.1 Scope of Assignment

Diamond Head Consulting Ltd. (DHC) was retained to complete a long-term emerald ash borer strategy for 79 trees, which includes a five-year financial forecast, a comprehensive evaluation of options, as well as replanting recommendations. Project files provided by the University Neighbourhood Association (UNA) include:

- Email correspondence regarding the request for proposal
- GIS project files showing the location and general attributes of the ash trees to be managed

1.2 Executive Summary

This document outlines a 50-year integrated pest management strategy for 79 ash trees located in the Hamptons neighbourhood at the University of British Columbia, managed by the UNA. The strategy emphasizes the management of the ash trees affected by emerald ash borer (EAB) with an initial 15-year phase of aggressive systemic insecticide treatment, a maintenance phase incorporating reduced treatment frequency and biological controls, and a long-term diversification plan with selective preservation and replacement by resilient native and urban-appropriate tree species, supported by a cost-benefit analysis showing treatment as more economical than removal and replacement, with recommended replacement species adapted for the Pacific Northwest and Vancouver's urban forest condition.

2.0 Introduction

EAB is a federally regulated invasive pest that attacks and kills all ash species (*Fraxinus* spp.), with up to 99% mortality within 8–10 years after infestation occurs if trees are left untreated.[1] With EAB confirmed in Vancouver in 2024 and restrictions on the movement of ash wood imposed by the Canadian Food Inspection Agency (CFIA), management should shift from "preparedness" to "active preservation and phased replacement".[2]

There are 79 ash trees located in the southwest of the University of British Columbia's campus, in the Hamptons neighbourhood. The species composition is predominantly narrow-leaf ash (Fraxinus angustifolia), with six green ash (Fraxinus pennsylvanica) and one European ash (*Fraxinus excelsior*).

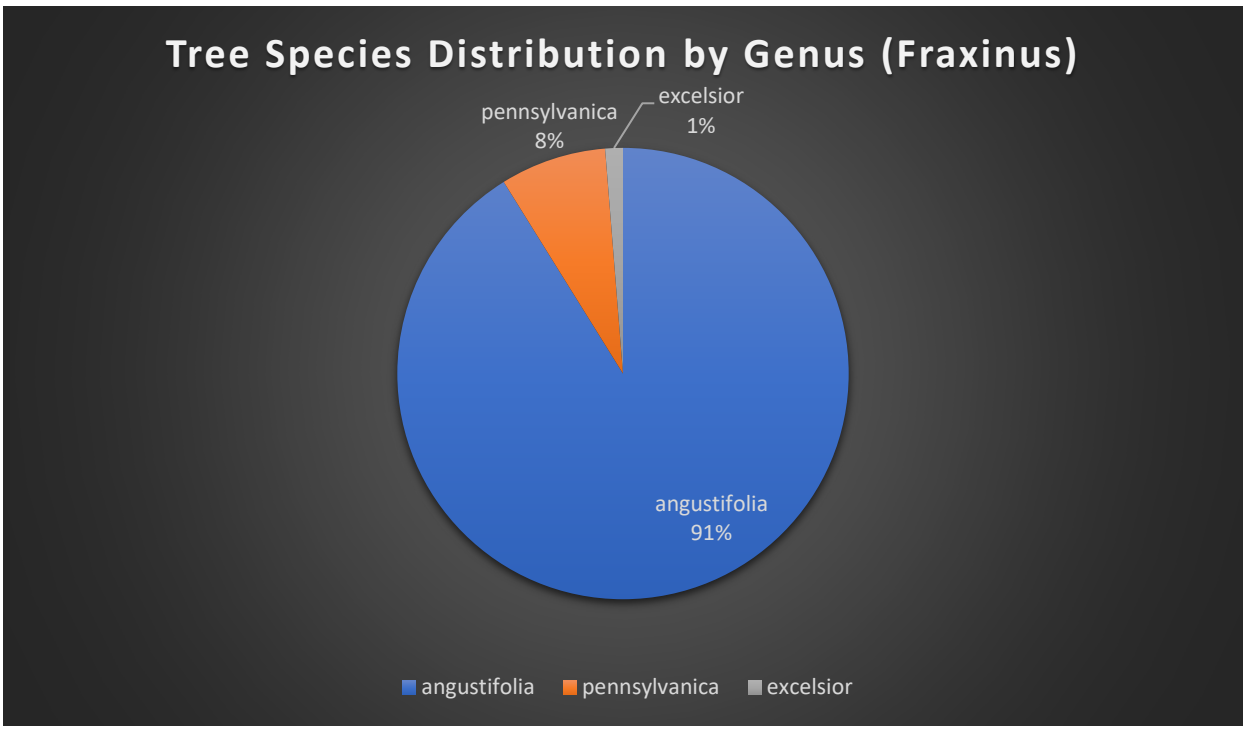

Figure 1. Ash tree species distribution at the Hamptons neighbourhood, UBC.

[1] Website accessed, April 20, 2026. Natural Resources Canada. https://natural-resources.canada.ca/forests-forestry/insects-disturbances/emerald-ash-borer

[2] Website accessed, April 20, 2026, Canada.ca, Canadian Food Inspection Agency. https://natural-resources.canada.ca/forests-forestry/insects-disturbances/emerald-ash-borer

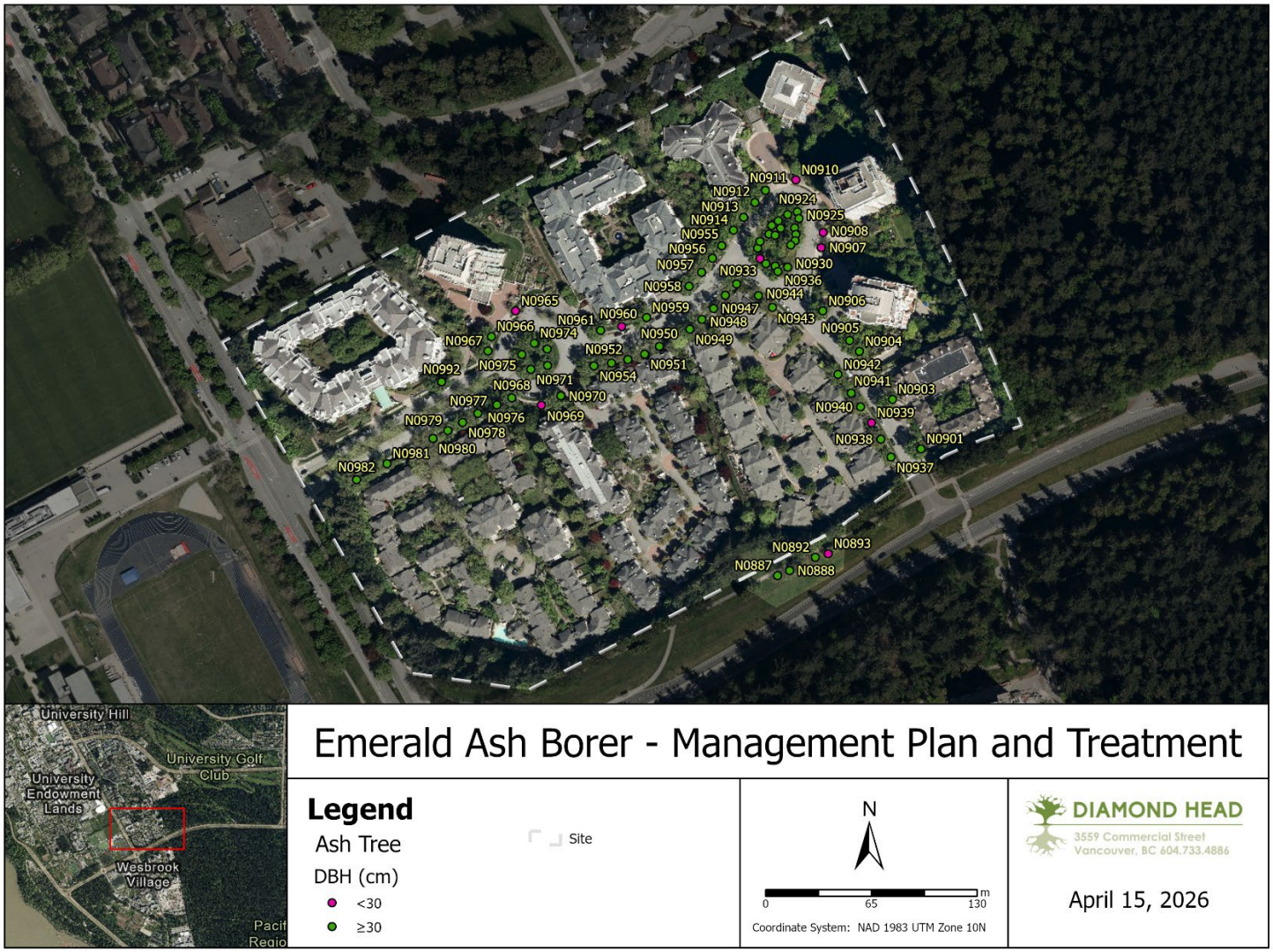

Figure 2. Overview of the locations of the 79 ash trees located in the Hamptons neighbourhood.

Nine of these trees are below 30cm in diameter at breast height (dbh) and are considered to small for trunk injection at the start of the 50-year plan. The average dbh is 42cm. Overall, the ash trees are in good condition, as shown by the average condition rating. The following chart shows the health rating for trees: 44 trees (most) are in excellent or good condition, 31 trees are in moderate condition, and 4 are in poor condition. Overall, the population is in relatively strong condition, making it a good candidate for **selective treatment and phased retention**, rather than immediate wholesale removal.

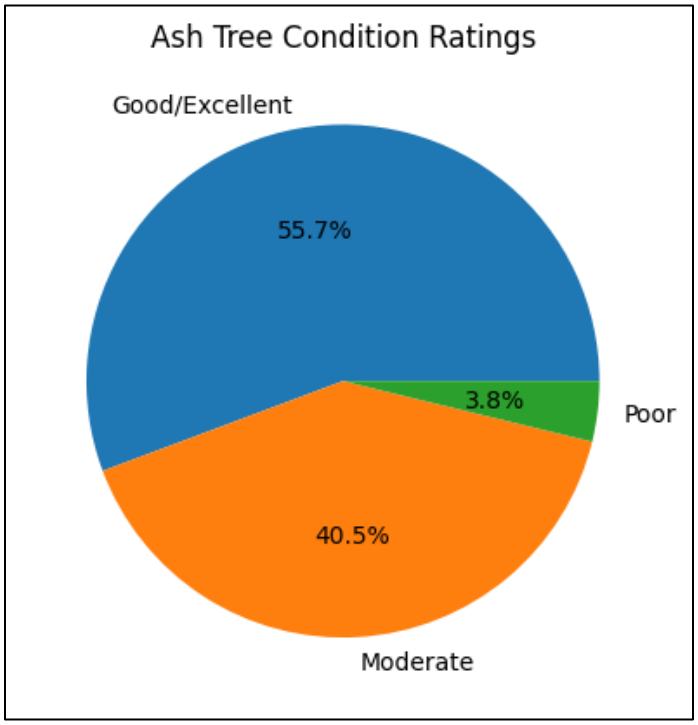

Chart 3. The ash tree's condition ratings. Most of the trees are in moderate to excellent condition. 55.7% of the ash trees are in good to excellent condition.

3.0 Core Management Objectives

The establishment of this plan aims to preserve a high-value canopy for as long as it remains economically viable. The intent is to minimize the sudden canopy loss from EAB and spread the costs of its management over this 50-year period. During this period, it is assumed that a transition to a diverse, climate-resilient urban forest will maintain safety in a high-use residential area. The strategy does not depend on young ash trees growing into the program, given the EAB threat. Most of the young trees under 30cm are not relied upon as future treated assets. The intent of the strategy is to:

1. Preserve high-value canopy
2. Minimize sudden canopy loss (avoid mass mortality event)
3. Spread costs over time
4. Transition to a diverse, climate-resilient urban forest

5. Reduce risk associated with the tree population

The strategy presents two possible approaches. A lean versus expanded strategy.

Lean Scenario
Under the lean scenario, the intention is to protect only the best currently injectable trees, accepting earlier canopy loss and transitioning faster.
Key features include:

- **39 trees injected in 2026**
- No bridge cohort
- Most non-core ash gone earlier
- Stronger cost control
- More visible canopy loss in the first 15 years

This would be a suitable approach if UNA wants

- Minimum long-term treatment footprint
- Simpler operations
- Lower ongoing injection commitment

Expanded Scenario
The alternate approach is the expanded scenario. Under this approach, there will be additional treatment in the first two decades to smooth canopy loss while replacement happens more slowly at a 1:1 ratio.

Key features include:

- **49 trees injected in 2026**
- Bridge trees retained temporarily
- N0933 brought in later
- Slower visual decline
- Slightly higher treatment burden but better neighbourhood canopy continuity

The Trees Fall into 4 Management Categories:

Category	Criteria	Strategy
A	High-value, good/excellent condition, prominent	Long-term treatment
B	Moderate condition or lower landscape value	Time-limited treatment (10–20 yrs)
C	Poor condition (3-4 trees)	Early removal
D	Young (<30 cm DBH)	Grow → future decision

4.0 Phase-Based Plan

The approach for UNA's 79 ash trees is considered a staged retention strategy, with proactive management that involves removing the worst trees right away, stabilizing the best trees and beginning the gradual replacement with more long-term diversification of the tree species. By the end of the 50-year horizon:

- The ash population will be fully or nearly fully removed
- A diverse, mixed-species canopy will be established
- No single species will dominate the canopy structure
- Age-class diversity will reduce future vulnerability to pests

4.1 Management Groups

The treated population is intentionally split into five functional groups. The management approach is to use a systemic insecticide (TreeAzin, azadirachtin) to control EAB. It is a systemic insecticide derived from neem tree seeds, not a neonicotinoid or synthetic chemical. TreeAzin is injected into the tree's vascular tissue via the EcoJect System, acting as a growth regulator that kills larvae and reduces adult fertility.

A. Core Retain Trees

This will be a small, high-value population kept alive for as long as reasonably possible, then phased out late in the 50-year horizon. These are the best long-term ash trees and are treated as legacy canopy trees.

- 25 trees
- Mostly larger and in better condition
- Injected from 2026 to 2068
- Removed gradually 2070-2074

B. Transition Retain Trees

This group are worth treating, but not forever. Strategically, these are the middle layer. They slow canopy loss in the first two decades and buy time for replacement to establish. They then exit before the long-term core group does.

- 14 trees

- Injected from 2026 to 2040
- Removed 2042-2046

C. Bridge Retain Trees

This group only appears in the expanded scenario. They are not the true long-term retention trees. Their role is to hold the canopy temporarily while the first wave of removal and replacement happens.

- 10 trees
- Injected from 2026 to 2032
- Removed 2034-2038

D. Non-Retention Trees

- This group are poor condition or low value trees that are removed early or allowed to decline without treatment.

E. Small Trees

- Not injectable at plan start
- Limited reliance on future treated assets
- Managed adaptively depending on growth and infestation timing

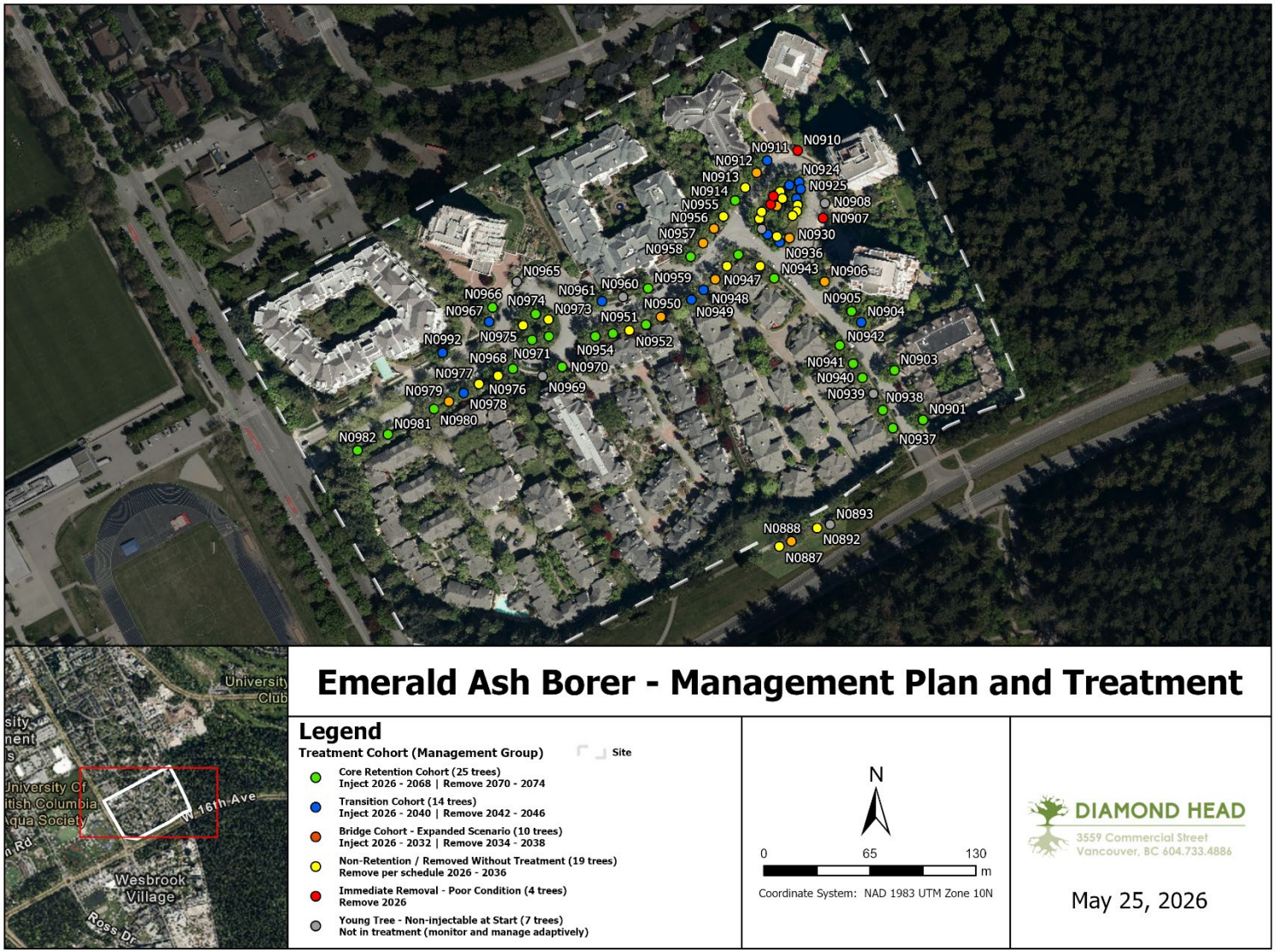

Figure 4. The treatments were organized by cohort over time so that the distribution of treatments can be visualized within the neighbourhood.

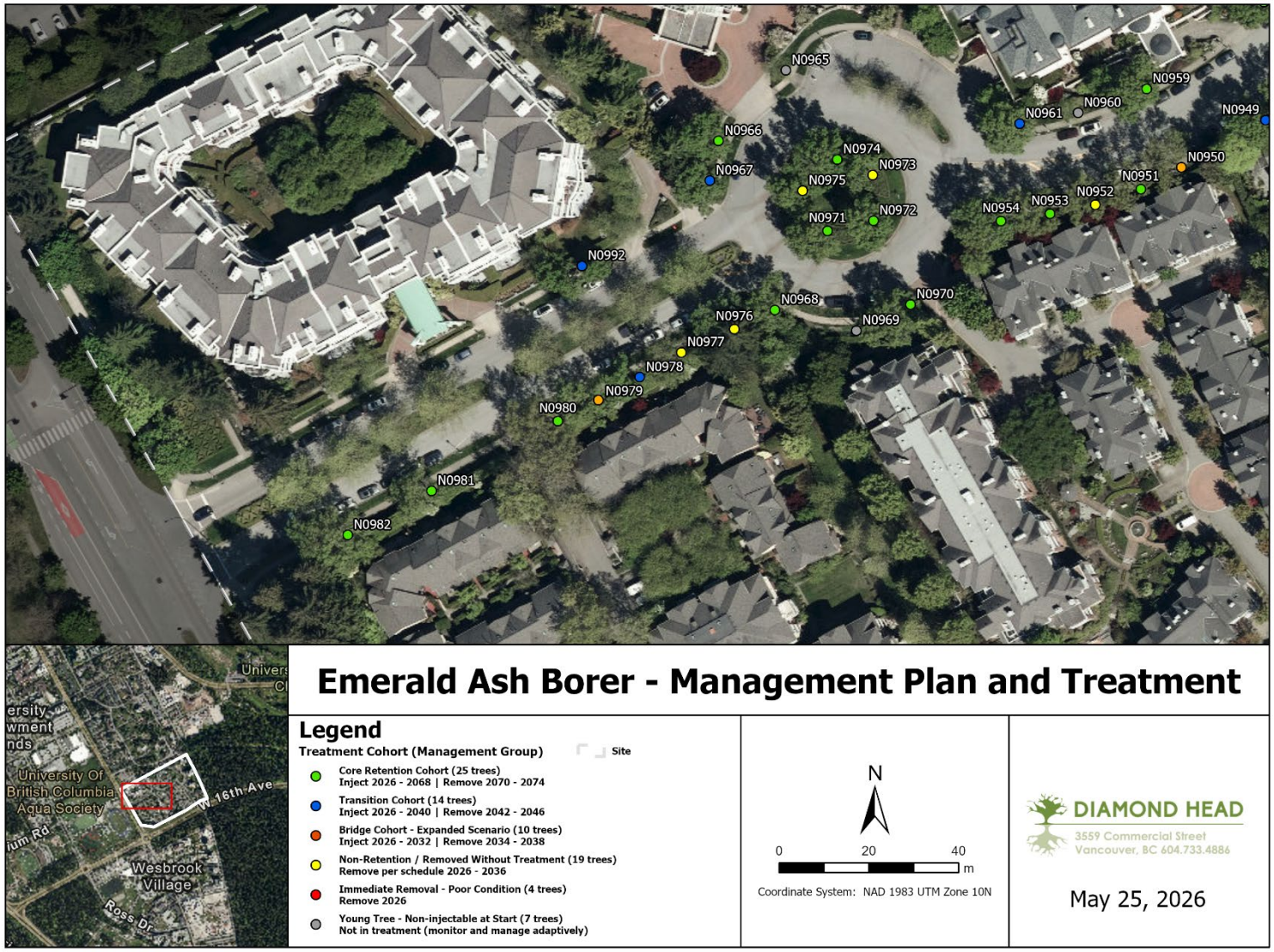

Figure 5. Detailed view of the UNA study area showing the spatial distribution of EAB management cohorts across the site.

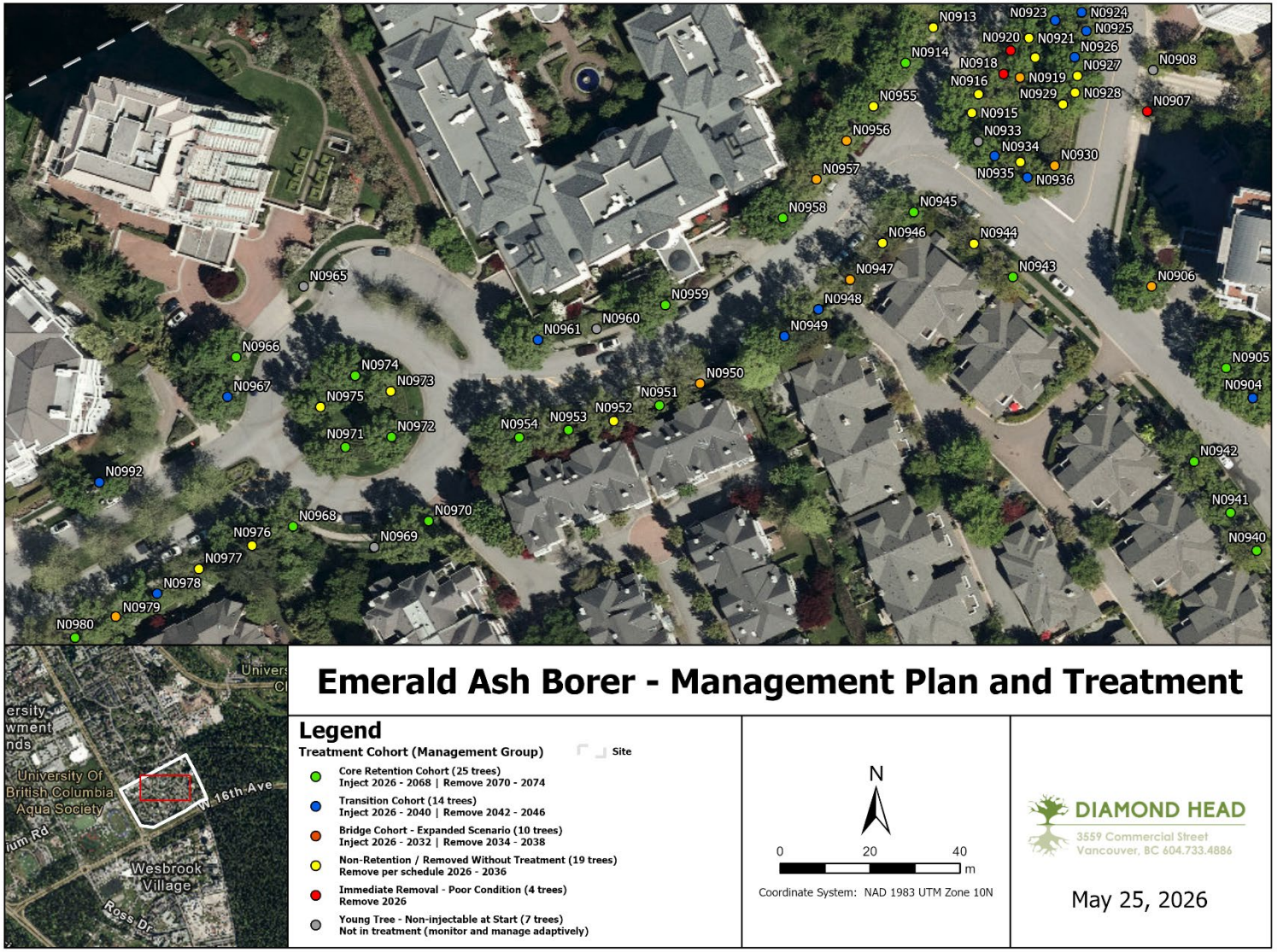

Figure 6. Detailed view of the UNA study area showing the spatial distribution of EAB management cohorts across the site.

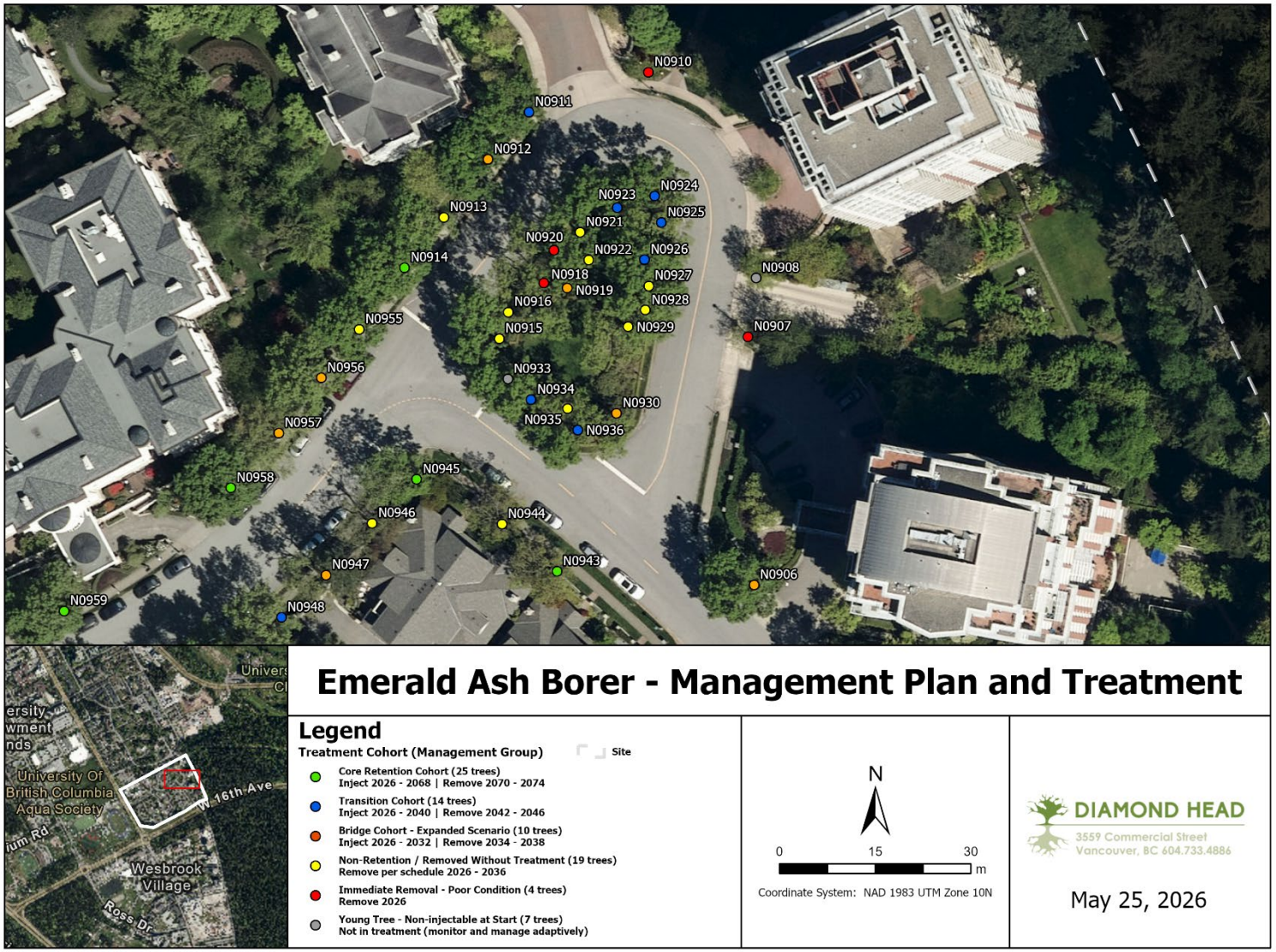

Figure 7. Detailed view of the UNA study area showing the spatial distribution of EAB management cohorts across the site.

Figure 8. Detailed view of the UNA study area showing the spatial distribution of EAB management cohorts across the site.

Figure 9. Detailed view of the UNA study area showing the spatial distribution of EAB management cohorts across the site.

4.2 Temporal Strategy (2026-2075)

4.2.1 Phase 1: Stabilization (2026-2038)

Objectives:

- Slow canopy loss
- Maintain neighbourhood tree presence
- Initiate gradual transition

Actions:

- Remove poor-condition trees immediately
- Begin injections on 39-49 trees (lean vs expanded scenarios)
- Initiate replacement planting (1:1 ratio)
- Begin phased removal of untreated trees

Outcome:

- Avoid sudden canopy collapse
- Maintain visual and ecological continuity

4.2.2 Phase 2: Transition (2039-2046)

Objectives:

- Maintain a small, high-value ash cohort
- Complete a long-term canopy transition

Actions:

- Continue injection of core trees until ~2068
- Gradually remove remaining ash (2070-2074)
- Maintain and expand replacement canopy

Outcome:

- Ash reduced to minimal or zero presence
- Diverse, resilient urban forest established

5.0 Suitable Replacement Tree Species List

5.1 Trees and Site Conditions

As part of UNA's Tree Risk Management Protocol, a suitable tree species list was compiled. The urban tree list is adapted from the Metro Vancouver Tree Species Database, which assesses species suitability based on current and projected climate data for the region. Replanting preference will be given to native species within the "Very Suitable" and "Suitable" categories. Any substitutions must be approved by UNA Operations. This list includes species assessed for their suitability to the current and projected future climates in the Metro Vancouver region.

Urban Tree List for Metro Vancouver in a Changing Climate

The list of over 300 tree species below are from the Metro Vancouver Urban Forest Climate Adaptation Initiative's tree species selection database. These species have been assessed for their suitability to the current and projected future climate in the Metro Vancouver region. **This list is intended to be used as a guide to inform decision-making by local practitioners rather than a prescriptive planting list.** All project materials are available publically on the Metro Vancouver website. Please visit metrovancouver.org and search 'Urban Forest'.

VERY SUITABLE = species anticipated to tolerate a broad range of sites under future climate

- Arbutus menziesii
- Albizia julibrissin *
- Arbutus unedo
- Calocedrus decurrens *
- Catalpa speciosa *
- Cedrus deodara *
- Celtis occidentalis *
- Celtis sinensis •
- Cercis canadensis
- Cotinus coggygria
- Crataegus crus-galli
- Crataegus x lavalleei
- Crataegus x mordenensis
- Cupressus arizonica *•
- Cupressus macrocarpa *
- Cupressus sempervirens
- Cupressus x leylandii
- Eucommia ulmoides
- Ficus carica *
- Fraxinus ornus
- Ginkgo biloba
- Gleditsia triacanthos
- Gymnocladus dioicus
- Juglans major •
- Juniperus chinensis
- Juniperus virginiana *
- Koelreuteria bipinnata *•
- Koelreuteria paniculata *
- Lagerstroemia x 'tuscarora'•
- Maackia amurensis •
- Maclura pomifera *•
- Notholithocarpus densiflorus
- Nyssa sinensis
- Olea europaea *•
- Phellodendron amurense *
- Pinus bankslana
- Pinus contorta
- Pinus flexilis
- Pinus mugo
- Pinus nigra
- Pinus pinea *•
- Pinus ponderosa
- Pinus sylvestris *
- Pinus thunbergii *
- Pistacia chinensis
- Prunus dulcis •
- Pyrus calleryana *
- Pyrus pyrifolia •
- Quercus acutissima *
- Quercus agrifolia •
- Quercus alba
- Quercus coccinea
- Quercus garryana
- Quercus ilex •
- Quercus imbricaria •
- Quercus macrocarpa
- Quercus shumardii
- Quercus suber •
- Quercus virginiana •
- Rhus typhina
- Sorbus aria
- Ulmus propinqua •

SUITABLE = species anticipated to tolerate all but the driest sites under future climate

- Abies concolor
- Abies procera
- Acer buergerianum •
- Acer campestre *
- Acer cappadocicum
- Acer grandidentatum •
- Acer griseum
- Acer japonicum
- Acer miyabei
- Acer negundo *
- Acer nigrum
- Acer platanoides *
- Acer pseudoplatanus *
- Acer rubrum *
- Acer saccharinum
- Acer saccharum
- Acer tataricum *
- Acer triflorum
- Acer x freemanii
- Aesculus hippocastanum *
- Aesculus x carnea
- Alnus cordata *
- Alnus rubra
- Amelanchier canadensis
- Amelanchier laevis
- Amelanchier x grandiflora
- Araucaria araucana
- Arbutus 'marina' •
- Betula alleghaniensis
- Carpinus betulus
- Carpinus japonica
- Castanea mollissima
- Castanea sativa
- Catalpa bignonioides *
- Cedrus atlantica
- Cercis chinensis
- Cercis occidentalis •
- Cercis siliquastrum
- Chamaecyparis obtusa
- Chamaecyparis pisifera
- Chionanthus retusus •
- Cladrastis kentukea
- Clerodendrum trichotomum
- Cornus controversa
- Cornus florida
- Cornus mas
- Corylus avellana *
- Corylus colurna
- Crataegus douglasii
- Crataegus grignonensis •
- Crataegus phaenopyrum *
- Cryptomeria japonica *
- Davidia involucrata
- Eriobotrya japonica •
- Eucalyptus pauciflora •
- Fraxinus angustifolia
- Fraxinus excelsior
- Fraxinus velutina
- Heptacodium miconioides •
- Hibiscus syriacus *
- Juglans regia
- Laburnum anagyroides *
- Laburnum x watereri *
- Lagerstroemia indica *•
- Ligustrum japonicum * •
- Ligustrum lucidum *•
- Liquidambar styraciflua
- Liriodendron tulipifera
- Magnolia grandiflora
- Malus baccata *
- Malus domestica
- Malus floribunda *
- Malus pumila *
- Malus sylvestris *
- Malus transitoria
- Malus tschonoskii •
- Malus x moerlandsii •
- Malus x zumi
- Manglietia insignis
- Morus alba *
- Nothofagus antarctica
- Ostrya carpinifolia
- Ostrya virginiana
- Oxydendrum arboreum
- Parrotia persica
- Photinia x fraseri •
- Picea glauca
- Picea omorika
- Picea pungens
- Pinus parviflora
- Pinus radiata *
- Platanus x hispanica
- Platycladus orientalis •
- Populus alba *
- Populus fremontii •
- Populus nigra *
- Prunus americana
- Prunus armeniaca
- Prunus avium *
- Prunus caroliniana
- Prunus cerasifera *
- Prunus cerasus *
- Prunus domestica *
- Prunus emarginata
- Prunus pendula •
- Prunus salicina
- Prunus sargentii
- Prunus serotina
- Prunus serrula
- Prunus serrulata
- Prunus subhirtella
- Prunus virginiana *
- Prunus x blireana
- Prunus x yedoensis
- Pseudotsuga menziesii
- Pyrus communis *
- Pyrus kawakamii •
- Pyrus salicifolia
- Quercus alba x robur
- Quercus bicolor
- Quercus frainetto
- Quercus lobata •
- Quercus robur *
- Quercus rubra
- Rhamnus purshiana
- Salix scouleriana
- Salix x sepulcralis
- Sequoiadendron giganteum
- Sophora japonica *
- Sorbus x thuringiaca
- Stewartia monadelpha
- Stewartia pseudocamellia
- Styrax japonicus
- Syringa pekinensis •
- Syringa vulgaris *
- Taxodium distichum
- Taxus baccata
- Taxus brevifolia
- Thuja occidentalis *
- Tilia americana
- Tilia cordata
- Tilia platyphyllos
- Tilia tomentosa
- Tilia x euchlora
- Tilia x europaea
- Trachycarpus fortunei
- Ulmus americana *
- Ulmus parvifolia *
- Ulmus procera *
- Ulmus wilsoniana 'prospector' •
- Ulmus x hollandica
- xChitalpa tashkentensis
- Zelkova serrata

6.0 Cost Implications

6.1 Assumption

As part of the 50-year strategy, a request was made to include the cost implications of implementing the strategy over time. Several assumptions were made to provide the cost outputs. The following table provides the assumptions made. The costs are provided for each treatment type so they can be adjusted if needed.

Table 1: Assumptions made in the overall costing by treatment type

Assumption	Value	Units/Notes
Base year	2026	
End year	2075	
Injection cost per cm DBH	$14	Cost per cm DBH per treatment event
Removal cost per cm DBH	$32	Cost per cm DBH for removal/disposal
Replacement planting cost	$1,200	Cost per tree planted
Establishment cost per planted tree	$300	Cost per planted tree per year
Establishment years	2	Number of years after planting
Replacement trees per removal	2	Trees planted per ash removed
Discount rate	3.0%	Optional nominal discount rate
Lean scenario note	Good/excellent injectable trees only	Planning assumption
Expanded scenario note	Lean + bridge cohort + N0933 later	Planning assumption
Stump grinding cost per removed tree	$450	Cost per removed tree stump

The overall costs for each treatment type, by year, are provided below:

Year	Lean Total Annual Cost	Expanded Total Annual Cost
2026	$ 40,829.40	$ 47,230.20
2027	$ 2,400.00	$ 2,400.00
2028	$ 28,447.00	$ 34,847.80
2029	$ 12,684.40	$ 12,684.40
2030	$ 40,320.20	$ 46,721.00
2031	$ 19,448.00	$ 19,448.00
2032	$ 45,864.60	$ 52,681.20
2033	$ 23,965.20	$ 20,164.80
2034	$ 46,763.80	$ 55,383.60
2035	$ 12,853.60	$ 22,104.00
2036	$ 33,325.80	$ 44,728.00
2037	$ 1,800.00	$ 12,751.20

Year	Lean Total Annual Cost	Expanded Total Annual Cost
2038	$ 26,647.00	$ 38,001.20
2039	$ -	$ 2,400.00
2040	$ 26,047.00	$ 27,662.80
2041	$ -	$ -
2042	$ 31,010.80	$ 34,811.20
2043	$ 14,308.40	$ 14,908.40
2044	$ 34,287.60	$ 34,887.60
2045	$ 15,673.20	$ 15,673.20
2046	$ 29,828.00	$ 29,828.00
2047	$ 3,000.00	$ 3,000.00
2048	$ 19,500.80	$ 19,500.80
2049	$ -	$ -
2050	$ 18,300.80	$ 18,300.80
2051	$ -	$ -
2052	$ 18,300.80	$ 18,300.80
2053	$ -	$ -
2054	$ 18,300.80	$ 18,300.80
2055	$ -	$ -
2056	$ 18,300.80	$ 18,300.80
2057	$ -	$ -
2058	$ 18,300.80	$ 18,300.80
2059	$ -	$ -
2060	$ 18,300.80	$ 18,300.80
2061	$ -	$ -
2062	$ 18,300.80	$ 18,300.80
2063	$ -	$ -
2064	$ 18,300.80	$ 18,300.80
2065	$ -	$ -
2066	$ 18,300.80	$ 18,300.80
2067	$ -	$ -
2068	$ 18,300.80	$ 18,300.80
2069	$ -	$ -
2070	$ 22,541.20	$ 22,541.20
2071	$ 27,035.60	$ 27,035.60
2072	$ 28,733.20	$ 28,733.20
2073	$ 28,176.40	$ 28,176.40
2074	$ 27,594.00	$ 27,594.00
2075	$ 6,000.00	$ 6,000.00
Total Cost	$ 832,093.20	$ 914,905.80

7.0 Conclusion

This strategy reflects a realistic and adaptive response to Emerald Ash Borer in an urban campus environment. It avoids both extremes of:

- attempting to save all ash indefinitely, and
- removing all ash immediately

Instead, it delivers a balanced, phased approach that:

- preserves canopy where it matters most
- manages risk and cost over time
- supports long-term ecological resilience

The result is a controlled transition from an ash-dominated canopy to a diverse and sustainable urban forest, aligned with UBC's broader landscape and sustainability objectives.

Appendix 1 Report Assumptions and Limiting Conditions

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4) Conditions affecting the trees subject to this report (the "Conditions", include without limitation, structural defects, scars, decay, fungal fruiting bodies, evidence of insect attack, discoloured foliage, condition of root structures, the degree and direction of lean, the general condition of the tree(s) and the surrounding site, and the proximity of property and people) other than those expressly addressed in this report may exist. Unless otherwise stated information contained in this report covers only those Conditions and trees at the time of inspection. The inspection is limited to visual examination of such Conditions and trees without dissection, excavation, probing or coring. While every effort has been made to ensure that any trees recommended for retention are both healthy and safe, no guarantees, representations or warranties are made (express or implied) that those trees will not be subject to structural failure or decline. The Client acknowledges that it is both professionally and practically impossible to predict with absolute certainty the behavior of any single tree, or groups of trees, in all given circumstances. Inevitably, a standing tree will always pose some risk. Most trees have the potential for failure and this risk can only be eliminated if the risk is removed. If Conditions change or if additional information becomes available at a future date, modifications to the findings, conclusions, and recommendations in this report may be necessary. Diamond Head expressly excludes any duty to provide any such modification of Conditions change or additional information becomes available.

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Appendix 2 Guide of Plant Appraisal, 10th Edition Categories

The rating categories used by Diamond Head Consulting are taken from the Guide for Plant Appraisal, the 10th edition, and summarize each tree based on both positive and negative attributes using six stratified categories. An additional High Risk category accounts for trees rated as high risk per TRAQ criteria. These ratings indicate health, structural and form conditions that influence a tree's ability to withstand local site disturbance during the construction process (assuming appropriate tree protection) and benefit a future urban landscape.

Excellent: High tree vigour and nearly perfect health, nearly ideal tree form, free of defects, and form is nearly ideal of the species. Generally symmetric. Consistent with the intended use. Species of *Populus, Alnus* and *Betula* are excluded from this category.

Good: Vigour is normal of species, no significant damage. Structure is Well developed and defects are minor and can be corrected. Form may have minor asymmetries/ deviations from the species norm. Mostly consistent with the intended use but function and aesthetics are not compromised.

Fair: Tree vigour is reduced. Damage due to pathogens may be significant but not likely to be fatal. Twig dieback, defoliation, discoloration may compromise up to 50% of the crown. Structure may have a single significant defect or multiple moderate defects that are not practical to correct or would require multiple treatments. Form would have major asymmetries/ deviations from the species norm. Function and/or aesthetics are compromised.

Poor: Tree is unhealthy and declining in appearance. Poor vigor. Canopy foliage is low density and of poor color. Potentially fatal pest infestation. The structure would have a serious defect or multiple significant defects. Recent change in tree orientation. There are observable problems that cannot be corrected. Failure may occur at any time. The form would be largely asymmetric/ abnormal that detracts from intended use and or aesthetics to a significant degree.

Very Poor: Poor vigour and appears to be dying/ at the last stages of life. Little live foliage. The structure would have single or multiple defects with failure probable or imminent. The form would be visually unappealing. It would provide little or no function in the landscape.

Dead: The tree is dead. Or have less than 5% live crown from its original percent.

High Risk: The tree shows severe health decline and/or with major structural weaknesses or decay. Dead or compromised tree parts increase the likelihood of failure, posing a high risk to nearby targets within the timeframe of this report. The tree is not suitable for retention due to deteriorating tree conditions and exceeding thresholds as a risk high or extreme risk as outlined in Appendix 5. See Section 3.2 for individual detailed risk assessments.